

Enzyme-Catalyzed Resolution of Racemate using Enzyme Functionalized Silica Nanoparticles in the Presence of Surfactants

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The enzyme-catalyzed resolution of racemic naproxen 2,2,2-trifluoroethyl thioester was performed by lipase immobilized on silica nanoparticles using a covalent bonding method. To increase the conversion and reaction rate of this resolution, the effect of non-ionic surfactants (M-SA 1025 and SN 20) was investigated. The optimal reaction conditions such as temperature and loading amount of immobilized lipase were also determined. The addition of M-SA 1025 resulted in the increase in reaction rate (V_S), conversion (X_S) and enantioselectivity (E value) comparison with SN 20 and the control. The reaction (V_S : 1.913×10^{-2} mM/h, X_S : 95.5%, E : 131.11) performed in a mixture containing M-SA 1025 at 50 °C with 48 U/mL of immobilized lipase was markedly improved the resolution of racemic naproxen 2,2,2-trifluoroethyl thioester compared to other conditions.